Revision 0
May 6, 2011

OPERATION, MAINTENANCE AND MONITORING PLAN

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Prepared For:

Operable Unit No. 4 of the Allied Paper, Inc./Portage Creek/ Kalamazoo River Superfund Site

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1.0 INTRODUCTION

On behalf of Weyerhaeuser NR Company (Weyerhaeuser), Conestoga-Rovers & Associates (CRA) has prepared this Operation, Maintenance, and Monitoring (OM&M) Plan for the 12th Street Landfill Operable Unit No. 4 (OU4), located at 481 12th Street North, in Plainwell, Michigan (Site) in fulfillment of one of the requirements of the United States Environmental Protection Agency (USEPA) Consent Decree (CD) (Civil Action No. 1:05-CV0003) dated January 3, 2005. In accordance with the CD, the OM&M Plan will provide the methodologies to be followed for the operation, maintenance and long-term monitoring of the remedy set forth in the OU4 Record of Decision (ROD), OU4 Scope of Work (SOW), OU4 Remedial Action Work Plan (RAWP), and for the achievement of the OU4 Performance Standards.

1.1 PURPOSE AND SCOPE

The ROD requires that deed restrictions be imposed on the 12th Street Landfill property as necessary to appropriately restrict future land use pursuant to Section 20120a (1)(i) of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended (NREPA) (i.e., for "limited industrial" land use). This OM&M Plan has been prepared in accordance with Section 20120b(3)(b and c) of Part 201, of the NREPA, and Rules R299.5538 and R299.5540 of the Part 201 administrative rules. This OM&M Plan outlines the requirements for site access control, the landfill cover, the erosion control measures, the groundwater monitoring system, and the passive landfill gas venting system. The groundwater and landfill monitoring activities are described in the Performance Standards Verification Plan (PSVP)? (RMT, 2008), which is Appendix D of the Final Design Report prepared by CRA, dated March 2010 (Final Design Report). This OM&M Plan includes the following information:

- Operation and Maintenance Objectives (Section 3.0)
- Operation and Maintenance Activities (Section 4.0)
- Record Keeping and Reporting (Section 7.0)
- Emergency Response/Health and Safety Plan (Section 8.0)

This OM&M Plan will be made available to personnel performing OM&M activities. Properly trained and qualified OM&M personnel will perform the operation, maintenance, and monitoring of the equipment and Site. The recommended operating practices described in this document are based on typical and stabilized operating conditions. Unusual or unforeseeable conditions may require modification of these practices. Changes to this OM&M Plan resulting from changed conditions at the Site will

be submitted to the USEPA. Revisions made to this OM&M Plan in the future will be tracked in Appendix A.

The scope of the activities described in this OM&M Plan are limited to the Site and the monitoring well network, which are situated on the property owned by Weyerhaeuser, with the exception of four upgradient monitoring wells (MW-101S, MW-101D, MW-102S, and MW-102D) located on the adjacent properties owned by the Michigan Department of Natural Resources (MDNR) and Wyoming Asphalt Company, respectively. The scope encompasses the components of the remedy installed as part of the Emergency Action performed in 2007 and performed as part of the Remedial Action (RA) performed in 2010.

2.0 DESIGN AND CONSTRUCTION DOCUMENTATION PLANS

The remedial construction for the 12th Street Landfill includes the following components:

- A landfill cover
- An erosion control system
- Site access controls
- A passive gas venting system
- A gas monitoring system
- A groundwater monitoring network
- A river water monitoring system

A description of these components is presented below.

2.1 LANDFILL COVER

Construction of the cover over the landfill was designed to meet the following objectives:

- To prevent the release of polychlorinated biphenyls (PCBs) to the environment
- To provide sideslope stability, flood protection, and erosion control
- To minimize infiltration of precipitation through the landfill
- To prevent migration of residuals or leachate from the landfill into the adjacent areas
- To eliminate direct contact hazards

The landfill cover was designed to meet the requirements of the ROD and the relevant portions of the current State of Michigan Solid Waste Management Act, Part 115 of the NREPA, 1994, Act 451, as amended (Part 115).

The landfill cover meets the requirements of Rule R299.4425(5) of Part 115, which allows for an alternative landfill cover design if the alternative landfill cover includes (a) an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in Sub rule (3), and (b) an erosion layer that provides equivalent protection from wind and water erosion as the erosion layer specified in Rule R299.4425(3).

The landfill cover consists of the following layers, from the bottom up:

- A fill layer consisting of 6 inches of select granular fill with a hydraulic conductivity of $1.0x10^{-2}$ cm/s
- A barrier layer consisting of 40-millimeter (mil) linear LLDPE geomembrane with a hydraulic conductivity layer of $4.0x10^{-13}$ cm/s
- A conveyance layer consisting of geocomposite drainage material (geonet), placed directly above the 40-mil LLDPE liner
- A fill layer consisting of 24-inch thick general fill
- A vegetative layer consisting of a 6-inch thick topsoil layer

The top of paper residual grades and landfill cover grades are shown on Drawing C-05 – Subgrade Contour Plan and Drawing C-07 – Final Contour Plan, respectively. The top area of the landfill has a minimum slope of 5 percent and a maximum slope of 4H:1V.

2.2 EROSION CONTROL SYSTEM

In accordance with the ROD, following the installation of the liner cover system (LLDPE geomembrane liner, geonet, and fill layer), an erosion control system consisting of a combination of riprap and a turf reinforcement mat was installed on the eastern side of the landfill adjacent to the Kalamazoo River. The riverbank from approximately 698.0 to 702.5 above mean sea level (AMSL) was regraded to a 3H:1V slope and covered by riprap over a geotextile fabric. Upslope of the riprap, 6 inches of topsoil was placed across the bench at approximately 703.0 AMSL. From 702.5 to 707.0 AMSL, on the regraded 5H:1V sideslope, 6 inches of general fill material was installed on the eastern sideslope, overlain by 6 inches of topsoil. The topsoil was then covered with erosion control matting (Enkamat®). The erosion control matting can be characterized by a three-dimensional nylon turf reinforcement mat made of nylon filaments joined at intersections.

In order to control erosion on the west side of the landfill, surface water runoff will be redirected by a combined access road/drainage ditch that discharges into the on-Site wetland to the north. Surface water runoff on the southern side of the landfill will be diverted to the east through a shallow ditch that directs runoff to the Kalamazoo River for discharge. Surface water on the northern side of the landfill will be allowed to sheet flow off the cover system into a combined shallow ditch/access road that has V-notches along the outside of the ditch that enable collected surface water to discharge to the adjacent wetland to the north. The overall site drainage and erosion control system is detailed on Drawing C-03 – Soil Erosion and Sediment Control Plan. In addition, there

are specific details for the perimeter drainage swales and drainage outlets presented on Drawing C-11, Details 5 through 8 of the Final Design Report. The location of the riprap and the turf reinforcement mat is shown on Figure 3.

2.3 SITE ACCESS CONTROLS

Fencing, gates, locks, signs, and permanent markers have been installed to restrict access to the landfill. The locations of the access controls are shown on Figure 2.

2.4 PASSIVE GAS VENTING SYSTEMS

In accordance with the ROD, the need for a gas venting system was evaluated, and it was determined that it was necessary to vent landfill gas generated by the 12th Street Landfill. A passive gas system has been installed as part of the RA. The passive gas venting system consists of the following components:

- A 6-inch select granular fill layer that has been installed on the top of the paper residuals (beneath the liner)
- A series of 11 passive gas vent locations, spaced approximately 200 feet apart across the surface of the landfill footprint, installed within the granular venting layer via a gravel pad at each gas vent location
- Each passive gas vent consists of 4-inch diameter "L-shaped" polyvinyl chloride (PVC) schedule 40 riser pipes penetrating through the landfill cover system (including boots through the liner) to vent any collected gas directly to the atmosphere

Details for the passive gas vents and risers are shown on Drawing C-12, Detail 12 of the Final Design Report. Gas vent locations are shown on Figure 3.

2.5 GAS MONITORING SYSTEM

In accordance with the ROD, a gas monitoring system consisting of three gas probes has been installed around the southern boundaries of the landfill footprint. The locations of the gas probes are shown on Figure 3. Two gas probes have been installed as shallow monitoring locations (GP-1 and GP-3) and one gas probe (GP-2) has been installed as a deeper monitoring location. The shallow gas probes are installed to a depth of 4 to 5 feet below ground surface (bgs) with a 2-foot slotted pipe, and the deep gas probe is installed

to a depth of approximately 30 feet bgs with a 25-foot slotted pipe. Gas probes have been constructed using a stopcock and hose barb assembly with a ½-inch PVC ball valve and a ½-inch threaded connector. Gas probe assemblies are contained at each location with a standard lockable well casing. Typical gas probe construction details are shown on Drawing C-12, Detail 13 of the Final Design Report. Table 1 provides a summary of the construction details for the three gas probes. Gas probe construction logs are provided in Appendix B.

2.6 GROUNDWATER MONITORING NETWORK

In accordance with the requirements of the ROD, a groundwater monitoring network consisting of 15 overburden monitoring wells has been installed around the perimeter of the landfill.

Based on Site conditions and results obtained from the verification aquifer sampling during installation, six monitoring well pairs, consisting of a shallow groundwater monitoring well and a deep groundwater monitoring well, have been installed along the border of the landfill footprint. Two of the monitoring well pairs were installed at upgradient locations, with the other four monitoring well pair locations installed along the downgradient edges of the property. The remaining three monitoring wells consist of single well locations screened below the water table. The monitoring wells along the northern boundary of the landfill have been installed at approximately 200 feet on center. The shallow (i.e., screened at the water table) monitoring wells have been installed using a 7-foot screen, and the deep monitoring wells have been constructed with 5-foot screens.

Vertical aquifer sampling during the installation of the monitoring wells has allowed for the installation of monitoring well screens at the depth interval that is representative of the highest level of impact. Vertical profiling was performed at 10-foot intervals from the water table to a depth of approximately 40 feet below the water table. Groundwater samples were also collected above and below low permeable units greater than 2 feet thick.

A 0.010-inch slot with a No. 20-40 mesh sand pack has been used to construct the monitoring wells. Artificial sand packs have been installed from the base of the well screen to 1 foot above the top of the well screen. Above the top of the screen, the well was constructed with solid PVC risers. A bentonite seal extends from 1 foot above the top of the well screen to 2 feet below the ground surface, with concrete extending to the ground surface. At a minimum, 2 feet of bentonite seal has been placed above the top of the screen. The deep monitoring wells have been constructed with the sand pack extending 1 foot above the top of the screen and with a minimum 2-foot bentonite seal.

The annulus has been tremie-grouted from the bottom to the surface with a cement-bentonite grout. Monitoring wells have been constructed in accordance with American Society for Testing and Materials (ASTM) method D-5092-90. The locations of the groundwater monitoring wells are shown on Figure 3. Details for the groundwater monitoring well construction are summarized in Table 1 with completion logs provided in Appendix B.

2.7 RIVER WATER MONITORING SYSTEM

A staff gauge was installed proximal to the northeast corner of the 12th Street Landfill, as shown on Figure 3 and in accordance with Standard Operating Procedure (SOP) F-10 in the Field Sampling Plan (FSP) (Appendix B of the Final Design Report). The staff gauge, SG-101, will be used to measure the water level of the Kalamazoo River. The staff gauge has been installed along the river bank in a location so that river stage can be measured during relatively low river flows. Water level readings will be made during each of the groundwater sampling events. The staff gauge reading will be recorded to the nearest 0.01 foot.

3.0 OPERATION AND MAINTENANCE OBJECTIVES

This section describes the OM&M objectives for the 12th Street Landfill. A detailed description of the operation and maintenance activities is included in Section 4.

The objectives of the OM&M program are to ensure the effective operation and maintenance of the following in a manner that ensures their long-term reliability toward meeting the objectives of the remedial design and the ROD:

- Landfill cover
- Erosion control system
- Site access controls
- Passive gas venting system
- Gas monitoring system
- Groundwater monitoring system
- Staff gauge measurements

4.0 OPERATION AND MAINTENANCE ACTIVITIES

This section describes the operation and maintenance activities for the 12th Street Landfill.

4.1 LANDFILL COVER

The landfill cover and adjacent areas disturbed and revegetated during construction, will be visually inspected on a quarterly basis for the presence of adequate vegetation, and evidence of erosion or subsidence that could lead to surface water ponding and burrowing by animals. Needed repairs will be noted by OM&M personnel on a Site inspection form and reported to a representative of Weyerhaeuser. Repairs will be completed within 30 days of discovery, weather and Site conditions permitting. In addition, the vegetative cover will be maintained as necessary to prevent the growth of woody plants. The inspection frequency will be reduced to semi-annually after 2 years.

4.2 EROSION CONTROL SYSTEM

The riprap, the erosion control matting, and vegetation below elevation 707 feet AMSL will be visually inspected quarterly for the presence of an adequate amount of riprap (no exposed geotextile), possible movement of the riprap, the presence of adequate and thriving vegetation, evidence of erosion or rutting, and signs of burrowing animals. Needed repairs will be noted by OM&M personnel on a Site inspection form and reported to a representative of Weyerhaeuser. Repairs will be completed within 30 days of discovery, weather and Site conditions permitting. In addition, the vegetative cover below 707 feet AMSL, along the Kalamazoo River, will be maintained as necessary to prevent the growth of woody plants. The inspection frequency will be reduced to semi-annually after 2 years.

4.3 SITE ACCESS CONTROLS

Fencing, gates, and locks will be inspected quarterly for signs of vandalism, deterioration, or damage. Needed repairs will be noted by OM&M personnel on a Site inspection form and reported to a representative of Weyerhaeuser. Repairs will be completed within 30 days of discovery, weather and Site conditions permitting. The inspection frequency will be reduced to semi-annually after 2 years.

4.4 GAS VENTS

Gas vents will be inspected quarterly for structural integrity and identification labels. Needed repairs to the vents will be noted by OM&M personnel on a Site inspection form and reported to a representative of Weyerhaeuser. Repairs will be completed within 30 days of discovery, weather and Site conditions permitting. A description of potential contingency actions for the gas venting system is provided in the PSVP (Appendix D of the Final Design Report). The inspection frequency will be reduced to semi-annually after 2 years.

4.5 GAS PROBES

The gas probes will be inspected quarterly for structural integrity, the presence and the condition of locks, and identification labels. Needed repairs to the gas probes will be noted by OM&M personnel on a Site inspection form and reported to a representative of Weyerhaeuser. Repairs will be completed within 30 days of discovery, weather and Site conditions permitting. A description of potential contingency actions for the gas probe monitoring system is provided in the PSVP (Appendix D of the Final Design Report). A reduction in the monitoring frequency may be proposed to the USEPA after evaluating the data from the first 2 years.

4.6 GROUNDWATER MONITORING WELL MAINTENANCE

The groundwater monitoring wells will be inspected quarterly for structural integrity and the presence and condition of locks and identification labels. Needed repairs to the groundwater monitoring wells will be noted by OM&M personnel on a Site inspection report and reported to a representative of Weyerhaeuser. Repairs will be completed within 30 days of discovery, weather and Site conditions permitting. A description of potential contingency actions for the groundwater monitoring system is provided in the PSVP (Appendix D of the Final Design Report). A reduction in the monitoring frequency may be proposed to the USEPA after evaluating the data from the first 2 years.

5.0 GROUNDWATER MONITORING PROGRAM

Groundwater monitoring is to be conducted in accordance with the FSP and the results compared to the State of Michigan Part 201 groundwater surface water interface (GSI) criteria (included in Table 4.1 in the PSVP of the Final Design Report, Appendix D) and the Toxic Substances Control Act (TSCA) (40 CFR Section 761.75[b] [6], which describes the monitoring system requirements for chemical waste landfills). The long-term groundwater monitoring program requires groundwater monitoring on a quarterly basis for the first 2 years following installation of the groundwater monitoring wells. Each year of monitoring is to include two semi-annual monitoring events and two quarterly monitoring events. Each monitoring event will include confirmatory monitoring the day of the event to verify water levels are indicative of flow towards the Kalamazoo River. Groundwater sampling will begin with samples taken from wells that are closest to the river to reduce the influence on flow across the landfill footprint. Sampling order may change based on the results from the first sampling event. To prevent cross-contamination, wells that exhibit the highest concentrations of laboratory analytes will be sampled last. The proximity of each well to the river will be incorporated into this protocol. The field procedures that will be used for groundwater monitoring will be performed in accordance with SOP F-11 in the FSP (Appendix D of the Final Design Report).

The following sections describe the groundwater activities that will characterize the long-term groundwater monitoring program on a quarterly and semi-annual basis.

5.1 SEMI-ANNUAL GROUNDWATER MONITORING PROGRAM

Based on the results of the groundwater sampling that was conducted as part of the Remedial Investigation (RI), and the nature of the fill materials disposed in this landfill, the following analytical program has been developed for the Semi-Annual Monitoring Program. A complete list of laboratory analytes is shown in Table 4.3 in the PSVP (Appendix D of the Final Design Report).

SEMI-ANNUAL MONITORING PROGRAM	
Laboratory Analytes	*Field Measurements*
• PCBs	• Groundwater levels
• Dioxins and furans	• Surface water levels
• TAL Inorganics	• Turbidity
• Cyanide	• Temperature
• TCL SVOCs	• pH
• TCL VOCs	• Conductivity

TAL	Target Analyte List
TCL	Target Compound List
VOCs	Volatile Organic Compounds
SVOCs	Semi-Volatile Organic Compounds

5.2 QUARTERLY GROUNDWATER MONITORING PROGRAM

Based on the results of the groundwater sampling that was conducted as part of the RI, and the nature of the fill materials disposed in this landfill, the following analytical program has been developed for the Quarterly Monitoring Program. A complete list of laboratory analytes is shown in Table 4.3 in the PSVP (Appendix D of the Final Design Report).

QUARTERLY MONITORING PROGRAM	
Laboratory Analytes	*Field Measurements*
• PCBs	• Groundwater levels
• TCL VOCs	• Surface water levels
• Sodium	• Turbidity
• Mercury	• Temperature
• Cyanide	• pH
• Magnesium	• Conductivity

PCBs and VOCs are included in the quarterly sampling because they are known to be in the landfill residuals. Sodium, mercury, cyanide, and magnesium are included in the quarterly monitoring program because these are a subset of the semi-annual monitoring analytes that are leachable and typical of a variety of waste materials.

5.3 FIELD QUALITY CONTROL SAMPLES

Field quality control (QC) samples will be collected to assess the quality of the analytical data and to evaluate sampling and analytical reproducibility. Field QC samples will consist of field duplicate samples and triplicate blanks. A summary of QC sampling protocol and QC samples is provided in Section 4.3.3 and Table 4.2 in the PSVP (Appendix D of the Final Design Report), respectively.

5.4 GROUNDWATER MONITORING NETWORK AND SCHEDULE

The upgradient wells will be monitored for the first two quarters of the first year and subsequently monitored as needed. The downgradient wells will be monitored quarterly and semi-annually for the first 2 years after installation of the groundwater monitoring wells. Each year includes 2 semi-annual sampling events and 2 quarterly sampling events. Semi-annual sampling events will be conducted during the winter and summer seasons. Winter season semiannual sampling will be conducted during the months of December and/or January (weather permitting), and summer season semi-annual sampling events will be conducted during the months of June and/or July. Quarterly sampling events will be conducted during the spring and fall seasons. Spring season quarterly sampling events will be conducted during the months of March, April, or May, and fall season quarterly sampling events will be conducted during the months of October and/or November. A monitoring schedule is provided in Table 1.

Section II.4 of the SOW specifies the process for reducing the frequency of monitoring and the analytical program as follows:

> "After at least two years of sampling under the Semiannual Monitoring and Quarterly Monitoring Programs, Weyerhaeuser may petition to discontinue the Quarterly Monitoring program and sample only on a semiannual sampling frequency. Weyerhaeuser may at that time also petition to limit the number of parameters included in the Semiannual Monitoring program. After at least two years of sampling on only a semiannual basis, Weyerhaeuser may petition USEPA to switch to only performing the monitoring on an annual basis if there has been no significant change in sampling results between sampling events. After at least five (5) years of sampling on an annual basis only, Weyerhaeuser may petition USEPA to switch to a sampling frequency of once every five (5) years if there has been no significant change in sampling results between sampling events. The samples collected on a five-year basis shall be analyzed for the parameters specified in the original Semiannual Monitoring program. Each petition under this task is subject to USEPA review and written approval. USEPA reserves the right to require Weyerhaeuser to sample on a more frequent basis, and/or for additional parameters, based upon data indicating a significant change in sampling results between sampling events."

The SOW also states that the continued need for groundwater monitoring will be evaluated at each 5-year review until the USEPA, in consultation with the support Agency, determines that such monitoring is no longer needed.

6.0 LANDFILL GAS MONITORING PROGRAM

Three landfill gas probes have been installed along the southern sides of the landfill footprint. The locations of the gas probes are shown on Figure 3. The landfill gas monitoring probes will be monitored for combustible gas, carbon dioxide, oxygen, and pressure on a quarterly basis for the first 2 years. Section 3 of the PSVP contained in Appendix D of the Final Design Report provides the details regarding how the landfill gas monitoring will be performed and a description of contingency actions that may be taken if the performance standard is exceeded. A monitoring schedule is provided in Table 1.

7.0 RECORD KEEPING AND REPORTING

7.1 RECORD KEEPING

Maintenance, repairs, and inspections will be recorded on a Site inspection form and reported to a representative of Weyerhaeuser.

7.2 REPORTING

Reporting will be conducted on an annual basis for the previous year. The Annual Report will be submitted to the USEPA. Annual reports will include a summary of operation, maintenance, monitoring, inspection, and repair activities. Each annual report will include an assessment of the effectiveness of the remedy. A summary of the documentation in the Annual Report that will be provided to USEPA can be found under Section 4.5 of the PSVP (Appendix D of the Final Design Report).

7.2.1 OPERATION AND MAINTENANCE

A summary of the maintenance, inspection, and repair activities will be included in the annual reports for the Site.

7.2.2 MONITORING

A summary of monitoring activities described in the PSVP of the Final Design Report will be included in the annual reports, which will include the following information:

- **Landfill gas probes and vent locations** - A summary of the data collected during the monitoring activities and comparison to the Performance Standards
- **Groundwater monitoring wells** - A summary of the data collected during the sampling activities and comparison to the Performance Standards

7.2.3 GENERAL

The annual report will also include an assessment of the effectiveness of the institutional controls (in place at the time of the report) in preventing unauthorized access to the landfill and potential exposure to the paper residuals and landfill gas. A description of any contingency response actions taken as a result of unanticipated or changing

conditions related to the landfill will be documented in the annual reports. Minor events that were corrected during the reporting year will be documented in the annual reports.

Conditions that pose an immediate threat to health, safety, or the environment will be reported to the USEPA, the local Fire Department, and/or the Allegan County Health Department within 24 hours from the time that the threat is identified. Otsego Township officials will also be notified as appropriate. The telephone numbers for these parties are provided in the Health and Safety Plan in Appendix C.

8.0 EMERGENCY RESPONSE AND SAFETY PLAN

This section describes the general emergency response and safety guidelines for the OM&M activities at the landfill. Occupational Safety and Health Administration's (OSHA's), the Michigan Department of Natural Resources and Environment (MDNRE), and Weyerhaeuser's safety requirements are also applicable to the O&M activities.

8.1 SAFETY GUIDELINES

Personnel performing OM&M activities should be aware of the following potential health and safety concerns:

- A fire or explosion could occur if there is a spark in the presence of landfill gas
- Landfill gases could cause an oxygen-deficient atmosphere in the gas vents or in low-lying areas
- Hydrogen sulfide, a highly toxic and flammable gas, may be present in the gas vents or gas probes

General safety precautions for OM&M activities include the following:

- OM&M personnel will be made aware of the potential presence of landfill gas, the hazards associated with the gas, and the recommended safety precautions established to protect workers and the public from exposure to landfill gas
- No welding or other potential sources of ignition will be allowed in enclosed areas or over the waste disposal areas unless these activities are performed over ground mats or in areas of the Site approved for this purpose by Weyerhaeuser
- Smoking will be prohibited on the landfill property

8.2 EMERGENCY RESPONSE GUIDELINES

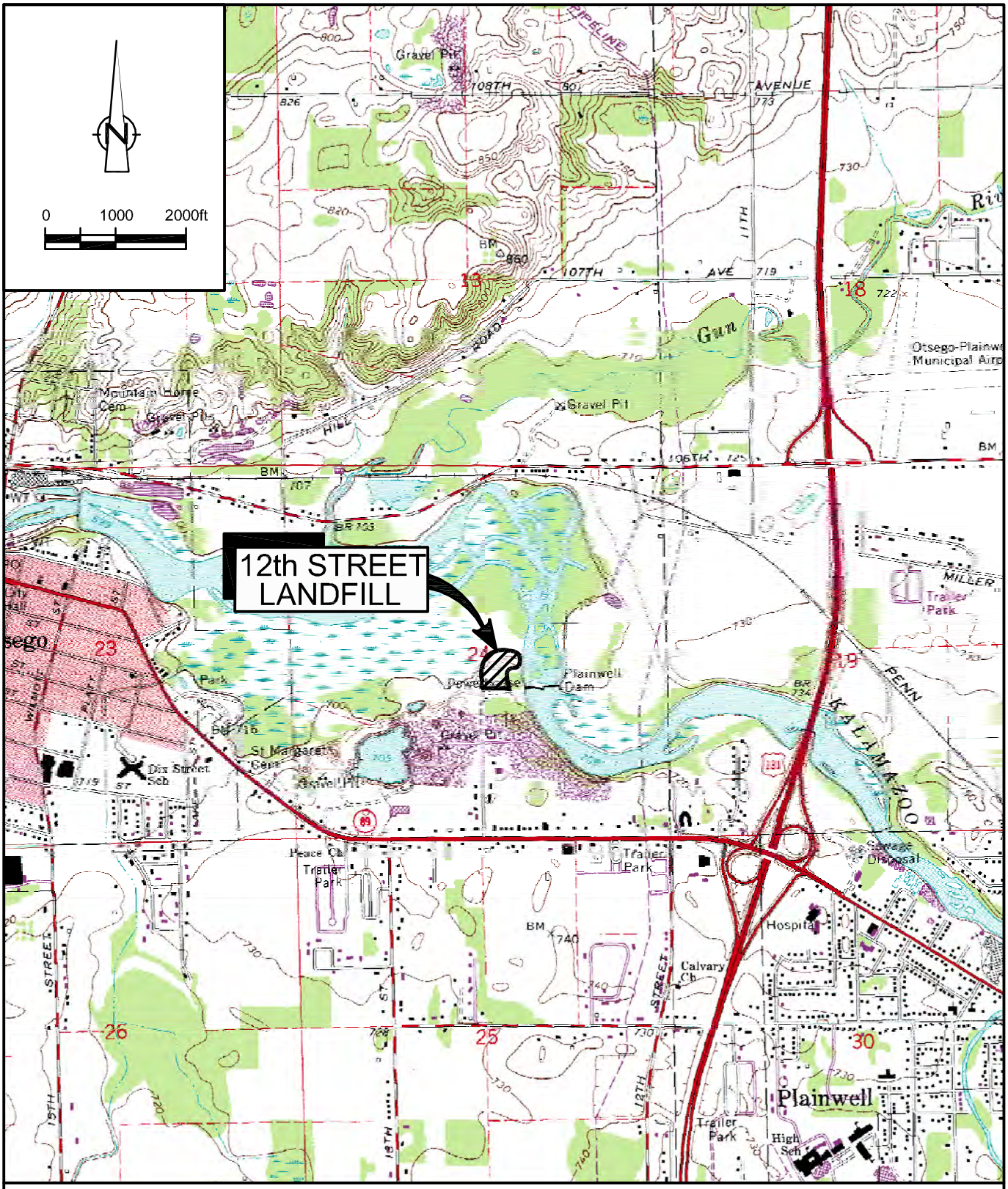
The following emergency situations could arise during the performance of the OM&M activities:

- An explosion or fire associated with the gas venting system
- Overexposure to inhaled landfill gases
- Vehicle accidents

Emergency response guidelines for OM&M activities include the following:

- Within 24 hours from the time a potential emergency is identified, notify the following Agencies:
  - MDNRE Pollution Emergency Alerting System (PEAS)
  - MDNRE Grand Rapids District Office
  - Local Fire Department or County Health Department
  - Otsego Township officials
- Notify the appropriate local public emergency response agency (e.g., fire, police, or ambulance)
- As conditions warrant, notify other personnel at the Site
- If evacuation of the Site is necessary, direct all personnel to the main entrance along 12th Street
- Notify the Weyerhaeuser Site representative, as soon as possible

FIGURES



SOURCE: USGS QUADRANGLE MAP;
OTSEGO, MICHIGAN
1967, REVISED 1973

figure 1
SITE LOCATION
OPERATION, MAINTENANCE AND MONITORING PLAN
12TH STREET LANDFILL SITE
Otsego Township, Michigan

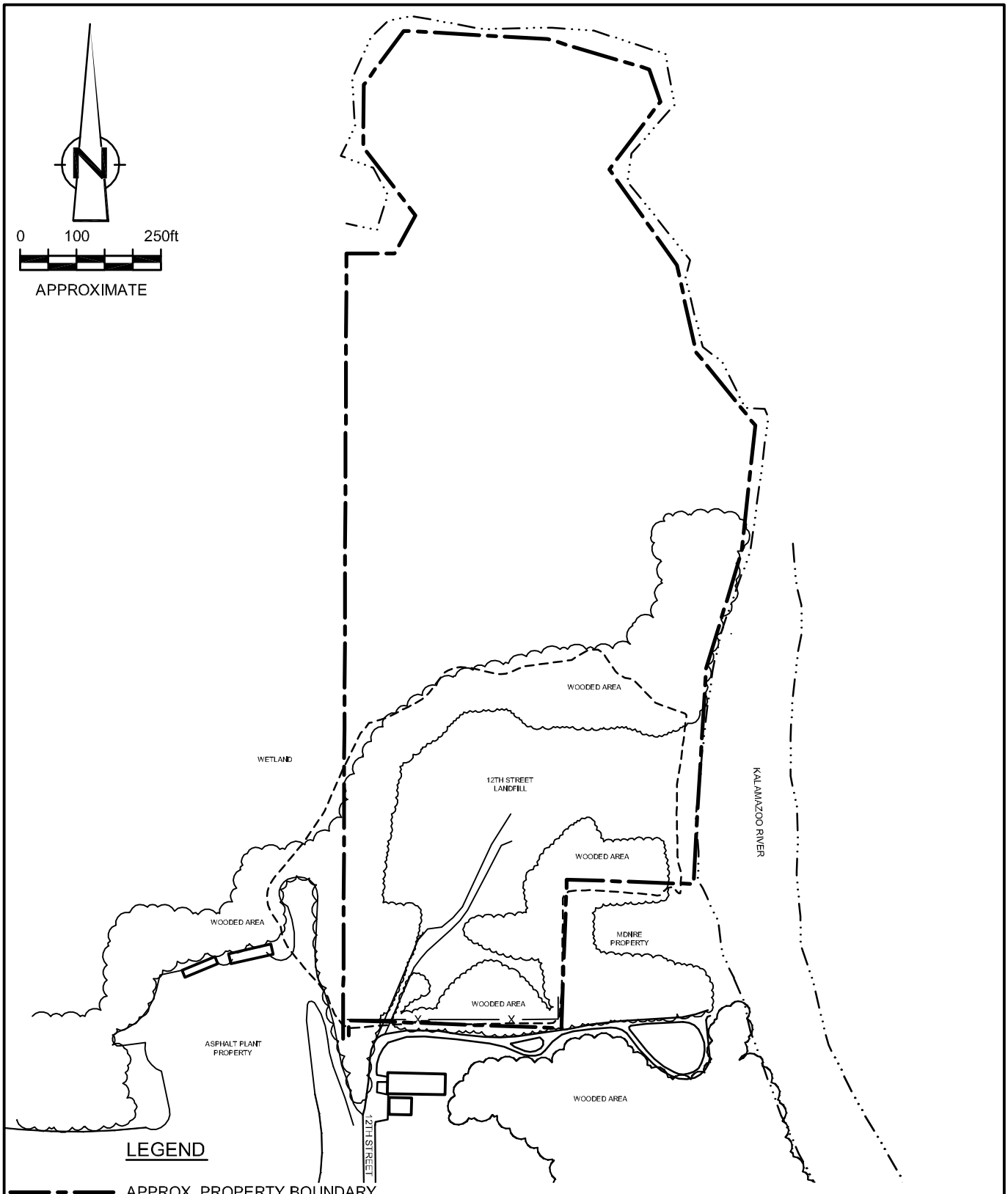
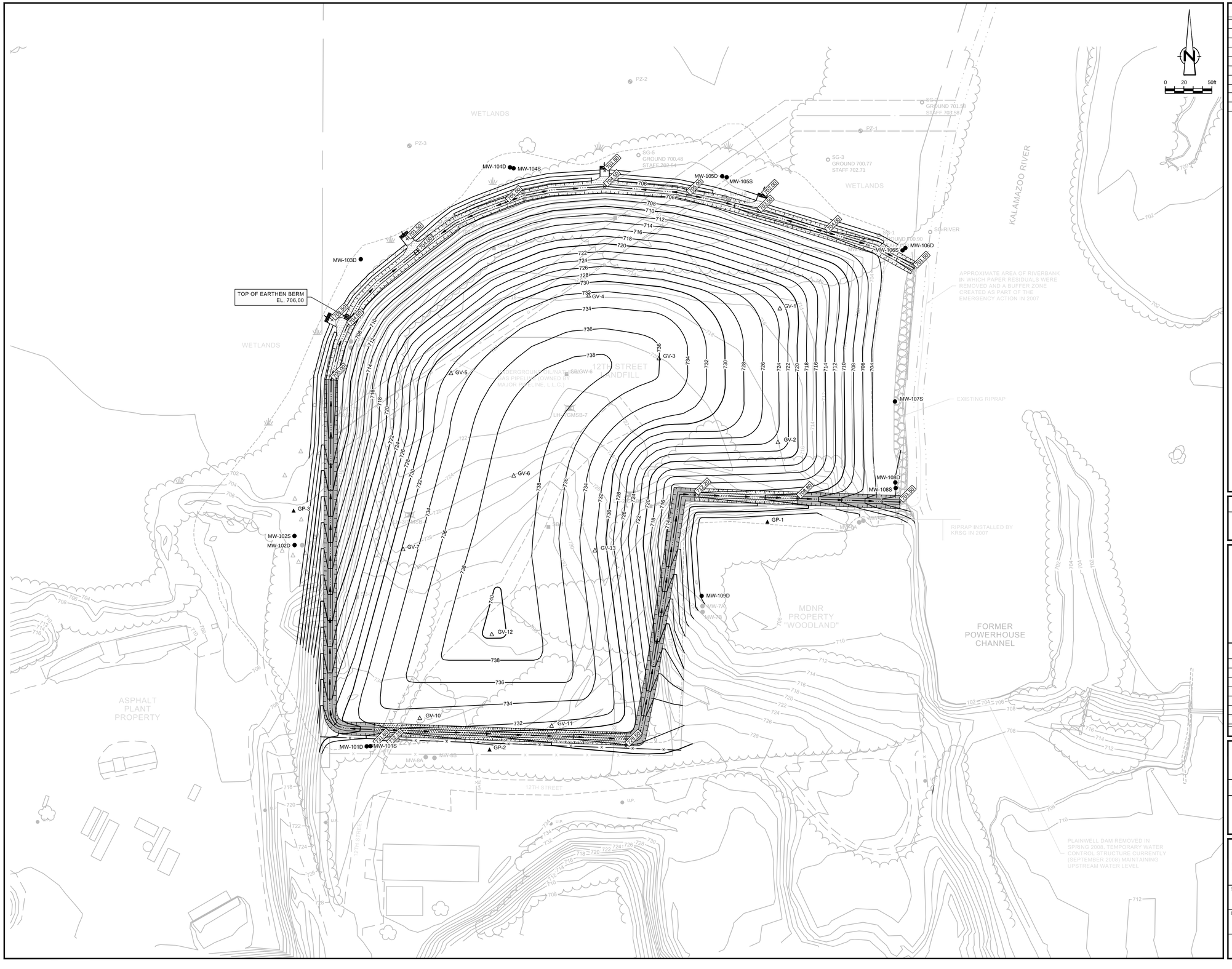


figure 2

SITE PLAN
OPERATION, MAINTENANCE AND MONITORING PLAN
12TH STREET LANDFILL SITE
Otsego Township, Michigan

056393-00(007)GN-SC002 NOV 18/2010



N⁰	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- FENCE
- BUILDING
- EXISTING GROUND ELEVATION CONTOUR
- TREES AND/OR BRUSH
- WET AREA AND WETLAND
- EDGE OF WATER
- FINAL ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE c/w TURF REINFORCEMENT MAT
- ROAD/DRAINAGE SWALE STABILIZED WITH GEOWEB
- GV-1 GAS VENT LOCATION
- MW-106B MONITORING WELL LOCATION
- GP-1 GAS PROBE LOCATION

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

OPERATION, MAINTENANCE, AND MONITORING PLAN

OM&M
MONITORING LOCATIONS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	APRIL 2011	
Scale: AS SHOWN	Project N⁰: 56393-08	Report N⁰: 007	Drawing N⁰: figure 3

56393-08(007)GN-WA001 APR 29/2011

TABLES

TABLE 1

MONITORING LOCATION COMPLETION DATA
12th STREET LANDFILL
OTSEGO, MICHIGAN

	Ground Surface Elevation (feet AMSL)	*Reference Elevation* (feet AMSL)	*Well Depth* (feet)	*Screen Length* (feet)	*Depth to Top of Screen* (feet)	*Top of Screen Elevation* (feet AMSL)
Monitoring Locations						
Groundwater Monitoring Wells						
MW-101S	734.35	737.46	39	7	32	695.35
MW-101D	734.33	737.14	75	5	70	702.35
MW-102S	704.18	707.36	10	7	3	701.18
MW-102D	704.43	707.43	45	5	40	664.43
MW-103D	704.37	707.36	35	5	30	674.37
MW-104S	703.86	706.55	25.5	7	19	685.36
MW-104D	703.48	706.42	45	5	40	663.98
MW-105S	704.89	707.86	12	7	5	699.89
MW-105D	704.79	707.89	47	5	42	662.79
MW-106S	703.89	706.96	9	7	2	701.89
MW-106D	703.66	706.36	45	5	39	664.66
MW-107S	703.76	706.73	13	5	8	695.76
MW-108S	703.32	706.21	9	7	2	701.32
MW-108D	703.39	706.16	45	5	40	663.39
MW-109D	707.41	710.46	23	5	18	689.41
Gas Probes						
GP-1	707.35	709.88	4	2	2	705.35
GP-2	732.88	736.12	32	25	5	727.88
GP-3	703.51	706.47	5	2	2.25	701.01

TABLE 2

OM&M SCHEDULE
12th STREET LANDFILL
OTSEGO, MICHIGAN

Year	*Year 1 - 2011*				*Year 2 - 2012*				*Year 3 - 2013*		*Year 4 - 2014*		*Year 5 - 2015*
Event	*Quarterly*	*Semiannual*	*Quarterly*	*Semiannual*	*Quarterly*	*Semiannual*	*Quarterly*	*Semiannual*	*Semiannual*	*Semiannual*	*Semiannual*	*Semiannual*	*Annual*
Season	*Winter 2011*	*Spring 2011*	*Summer 2011*	*Fall 2011*	*Winter 2012*	*Spring 2012*	*Summer 2012*	*Fall 2012*	*Spring 2013*	*Fall 2013*	*Spring 2014*	*Fall 2014*	*Summer 2015*
Monitoring Locations													
Groundwater Monitoring Wells													
Upgradient													
MW-101A	X	X											
MW-101B	X	X											
MW-102	X	X											
Downgradient													
MW-103	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-104A	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-104B	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-105	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-106A	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-106B	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-107	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-108	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-109	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-110	X	X	X	X	X	X	X	X	X	X	X	X	X
Gas Probes													
GP-1	X	X	X	X	X	X	X	X	X	X	X	X	X
GP-2	X	X	X	X	X	X	X	X	X	X	X	X	X
GP-3	X	X	X	X	X	X	X	X	X	X	X	X	X
Staff Gauge													
SG-01	X	X	X	X	X	X	X	X	X	X	X	X	X
*Maintenance Locations**													
Inspections													
Landfill Cover	X	X	X	X	X	X	X	X	X	X	X	X	X
Erosion Control System	X	X	X	X	X	X	X	X	X	X	X	X	X
Site Access Controls	X	X	X	X	X	X	X	X	X	X	X	X	X
Gas Vents	X	X	X	X	X	X	X	X	X	X	X	X	X
Gas Probes	X	X	X	X	X	X	X	X	X	X	X	X	X
Groundwater Monitoring Wells	X	X	X	X	X	X	X	X	X	X	X	X	X
Staff Gauge	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes:

X Semiannual Monitoring Event per USEPA approval for petition for reduction from Quarterly Monitoring Program.

X Annual Monitoring Event per USEPA approval for petition for reduction from Semiannual Monitoring Program.

* Includes Quarterly maintenance and inspection tasks for the Site.

APPENDIX A

REVISIONS TO OPERATIONS, MAINTENANCE AND MONITORING PLAN

APPENDIX B

STRATIGRAPHY AND MONITORING WELL/ GAS PROBE CONSTRUCTION LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-101S
DATE COMPLETED: February 1, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351038.12
EASTING: 12771358.94

TOP OF CASING 737.46
GROUND SURFACE 734.35

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	SM-SILTY SAND (FILL), loose, fine grained, poorly graded, yellowish brown, damp	733.35
2	- trace fine grained subangular gravel at 0.3ft BGS	733.05
	SM-SILTY SAND (TOPSOIL), trace roots, compact, brown, damp	
4	SM-SILTY SAND (natural), trace fine to coarse grained, gravel, trace roots, compact, fine grained, poorly graded, yellowish brown, damp	728.85
6	SP-SAND, trace fine grained subrounded gravel, trace silt, compact, medium grained, trace coarse grained sand, poorly graded, yellowish brown, damp	
8		
10	- fine grained sand, with fine grained gravel at 10.5ft BGS	
12	- medium grained sand, with fine grained gravel at 12.5ft BGS	
14		
16		
18	- moist at 17.0ft BGS - trace coarse grained subrounded gravel at 17.5ft BGS - 3" lens highly oxidized at 18.5ft BGS	
20		
22	- 6" lens sandy gravel at 21.5ft BGS	
24		
26	- occasional lenses sand, fine grained gravel at 26.0ft BGS	
28	- occasional oxidized lenses, moist to very moist at 26.5ft BGS	
30		
32	GP-SANDY GRAVEL, compact, medium grained sand, fine grained rounded gravel, poorly graded, brown, very moist	702.35
34	- wet at 33.5ft BGS	

MONITORING WELL: CONCRETE; BENTONITE GROUT; 2" PVC WELL CASING; 8" BOREHOLE; BENTONITE CHIPS; 2" PVC WELL SCREEN

SAMPLE: NUMBER | INTERVAL | REC (%) | 'N' VALUE

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 4/25/11

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-101S
DATE COMPLETED: February 1, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
36	- 5' no recovery, coarse gravel in shoe of sampler at 35.0ft BGS		SAND PACK				
38	END OF BOREHOLE @ 39.0ft BGS	695.35	WELL DETAILS Screened interval: 702.35 to 695.35ft 32.00 to 39.00ft BGS Length: 7ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: 705.35 to 703.35ft 29.00 to 31.00ft BGS Material: BENTONITE CHIPS Sand Pack: 703.35 to 695.35ft 31.00 to 39.00ft BGS Material: #4 SAND				
40							
42							
44							
46							
48							
50							
52							
54							
56							
58							
60							
62							
64							
66							
68							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-101D
DATE COMPLETED: February 1, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351037.94
EASTING: 12771354.87

TOP OF CASING 737.14
GROUND SURFACE 734.33

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	SM-SILTY SAND (FILL), loose, fine grained, poorly graded, yellowish brown, damp	733.33
2	- trace fine grained subangular gravel at 0.3ft BGS	733.03
	SM-SILTY SAND (TOPSOIL), trace roots, compact, brown, damp	
4	SM-SILTY SAND (natural), trace fine to coarse grained, gravel, trace roots, compact, fine grained, poorly graded, yellowish brown, damp	
6		728.83
	SP-SAND, trace fine grained subrounded gravel, trace silt, compact, medium grained, trace coarse grained sand, poorly graded, yellowish brown, damp	
8		
10	- fine grained sand, with fine grained gravel at 10.5ft BGS	
12	- medium grained sand, with fine grained gravel at 12.5ft BGS	
14		
16		
	- moist at 17.0ft BGS	
18	- trace coarse grained subrounded gravel at 17.5ft BGS	
	- 3" lens highly oxidized at 18.5ft BGS	
20		
	- 6" lens sandy gravel at 21.5ft BGS	
22		
24		
26	- occasional lenses sand, fine grained gravel at 26.0ft BGS	
	- occasional oxidized lenses, moist to very moist at 26.5ft BGS	
28		
30		
32	GP-SANDY GRAVEL, compact, medium grained sand, fine grained rounded gravel, poorly graded, brown, very moist	702.33
34	- wet at 33.5ft BGS	

MONITORING WELL: CONCRETE; BENTONITE GROUT; 2" PVC WELL CASING; 8" BOREHOLE

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE
1MC		50	
2MC		50	
3MC		80	
4MC		80	
5MC		80	
6MC		80	
7MC		50	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 4/25/11

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-101D
DATE COMPLETED: February 1, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
36	- 5' no recovery, coarse gravel in shoe of sampler at 35.0ft BGS						
38				8MC		0	
40	- poor recovery, coarse grained gravel in shoe of sampler at 40.0ft BGS						
42				39-44' -010			
				9MC		20	
44	- poor recovery at 45.0ft BGS						
46	SP-SAND, trace coarse grained gravel, compact, medium grained, poorly graded, brown, wet	688.33		44-49' -003			
48				10MC		20	
50	- poor recovery at 50.0ft BGS						
52				49-54' -009			
				11MC		10	
54							
56	- coarse sand, with fine grained gravel at 55.0ft BGS			54-59' -007			
58	- 6" lens coarse sandy gravel at 58.0ft BGS			12MC		60	
60							
62				59-64' -006			
				13MC		10	
64							
66	- medium grained sand, with fine grained gravel at 65.0ft BGS			64-69' -002			
68			BENTONITE CHIPS	14MC		60	

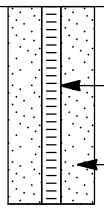
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( )

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-101D
DATE COMPLETED: February 1, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
72	- 5' no recovery at 70.0ft BGS		 2" PVC WELL SCREEN; SAND PACK	29-74' -001 15MC		0	
74	END OF BOREHOLE @ 75.0ft BGS	659.33					
76			WELL DETAILS Screened interval: 664.33 to 659.33ft 70.00 to 75.00ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: 667.33 to 665.33ft 67.00 to 69.00ft BGS Material: BENTONITE CHIPS Sand Pack: 665.33 to 659.33ft 69.00 to 75.00ft BGS Material: #1 SAND				
78							
80							
82							
84							
86							
88							
90							
92							
94							
96							
98							
100							
102							
104							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

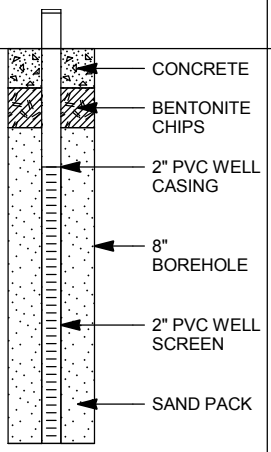
HOLE DESIGNATION: MW-102S
DATE COMPLETED: January 27, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351269.65
EASTING: 12771270.16

TOP OF CASING 707.36
GROUND SURFACE 704.18

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	SM/ML-SAND AND SILT (FILL), trace fine grained gravel, compact, fine grained, no plasticity, brown, moist	
4	- loose, wet at 4.8ft BGS	
8	SM/ML-SANDY SILT (natural), compact, fine grained sand, no plasticity, gray with olive gray lenses, wet	696.18
10	- 1" lens medium grained sand, brown at 8.7ft BGS	695.68 / 695.18 / 694.18
12	SM-SILTY SAND, compact, fine grained, poorly graded, gray, wet	
14	SM/GM-SAND AND GRAVEL, with silt, compact, fine to medium grained sand, fine grained gravel, well graded, yellowish brown, wet	
16	END OF BOREHOLE @ 10.0ft BGS	

MONITORING WELL



WELL DETAILS
Screened interval:
701.18 to 694.18ft
3.00 to 10.00ft BGS
Length: 7ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
703.18 to 702.18ft
1.00 to 2.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
702.18 to 694.18ft
2.00 to 10.00ft BGS
Material: #4 SAND

SAMPLE				
NUMBER	INTERVAL	REC (%)	'N' VALUE	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-102D
DATE COMPLETED: January 27, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351262.51
EASTING: 12771269.21

TOP OF CASING 707.43
GROUND SURFACE 704.43

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	SM/ML-SAND AND SILT (FILL), trace fine grained gravel, compact, fine grained, no plasticity, brown, moist	
4	- loose, wet at 4.8ft BGS	
8		696.43
	SM/ML-SANDY SILT (natural), compact, fine grained sand, no plasticity, gray with olive gray lenses, wet	695.93
		695.43
10	- 1" lens medium grained sand, brown at 8.7ft BGS	
12	SM-SILTY SAND, compact, fine grained, poorly graded, gray, wet	
14	SM/GM-SAND AND GRAVEL, with silt, compact, fine to medium grained sand, fine grained gravel, well graded, yellowish brown, wet	
	- medium to coarse grained sand with fine grained gravel at 13.0ft BGS	689.43
16	SP-SAND, with gravel, compact, fine grained sand, poorly graded, brown, wet	
18	- 3' sand, coarse grained gravel at 15.8ft BGS	
	- medium grained sand, trace fine grained gravel at 16.1ft BGS	
20	- 1.5" silty clay at 19.7ft BGS	
22	- medium to coarse grained sand at 22.8ft BGS	
24	GP-GRAVEL, with sand, compact, fine to coarse grained gravel, poorly graded, brown, wet	680.43
		678.93
26	SM/GM-SAND AND GRAVEL, with silt, loose, fine to medium grained sand, fine and coarse grained subrounded gravel, poorly graded, brown, wet	
28		
30	- 1" highly oxidized at 30.9ft BGS	673.43
32	SP-SAND, trace to with silt, compact, fine grained, poorly graded, brown, wet	
34	- 4" medium grained sand at 33.0ft BGS	

MONITORING WELL: CONCRETE; BENTONITE GROUT; 2" PVC WELL CASING; 8" BOREHOLE

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1MC		60		0.0
2MC 5-10' -107		80		0.0
3MC 10-15' -105		0		0.0
4MC 15-20' -106		60		0.0
5MC 20-25' -104		60		0.0
6MC 25-30' -103		60		0.0
7MC 30-35' -102		100		0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 4/25/11

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-102D
DATE COMPLETED: January 27, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36								
38	- 2.5" lens coarse grained sand and coarse grained gravel at 38.4ft BGS - medium grained sand at 39.4ft BGS		BENTONITE CHIPS	8MC 35-40' -101		90		0.0
40	- 1/4" lens highly oxidized at 39.6ft BGS - fine grained at 40.5ft BGS							
42			2" PVC WELL SCREEN	9MC 40-45' -098		80		0.0
44			SAND PACK					
46	END OF BOREHOLE @ 45.0ft BGS	659.43						
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								

WELL DETAILS
Screened interval:
664.43 to 659.43ft
40.00 to 45.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
668.43 to 665.43ft
36.00 to 39.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
665.43 to 659.43ft
39.00 to 45.00ft BGS
Material: #4 SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-103D
DATE COMPLETED: January 24, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351560.36
EASTING: 12771348.5

TOP OF CASING 707.36
GROUND SURFACE 704.37

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	SM/ML-SANDY SILT (TOPSOIL), loose, no plasticity, brown, moist	703.87
2	SM-SILTY SAND (FILL), trace fine grained gravel, compact, fine grained, poorly graded, light brown, moist	
6	SM/ML-SANDY SILT (FILL), trace gravel, compact, no plasticity, light brown, moist	698.37
8	- 2" lens silty clay, gray at 7.9ft BGS - brownish gray at 8.6ft BGS	695.87
10	SM-SAND, with silt, compact, fine grained, poorly graded, oxidized yellowish brown, wet	
12	- silty sand at 12.0ft BGS	
14		689.87
16	SP-GRAVELLY SAND, trace to with silt, loose, medium grained sand, fine grained subrounded gravel, poorly graded, yellowish brown, wet	
18	- fine grained sand, trace to with silt, laminated, light brown at 17.5ft BGS	
20		
22		
24		
26	- trace fine grained subrounded gravel at 26.2ft BGS	
28	- gravel not present, sand with silt at 27.0ft BGS	
30		
32		
34		

MONITORING WELL: CONCRETE; BENTONITE GROUT; 2" PVC WELL CASING; 8" BOREHOLE; BENTONITE CHIPS; 2" PVC WELL SCREEN; SAND PACK

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1MC		60		0.0
2MC		80		0.0
9-14' -095				
3MC		40		0.0
14-19' -093				
4MC		80		0.0
19-24' -091				
5MC		100		0.0
24-29' -089				
6MC				0.0
29-34' -087				
7MC		60		0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 4/25/11

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-103D
DATE COMPLETED: January 24, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36	- 6" dilatant sandy silt at 36.0ft BGS		WELL DETAILS Screened interval: 674.37 to 669.37ft 30.00 to 35.00ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: 677.37 to 675.37ft 27.00 to 29.00ft BGS Material: BENTONITE CHIPS Sand Pack: 675.37 to 669.37ft 29.00 to 35.00ft BGS Material: #4 SAND	34-39' -084				
38	SW/GW-SAND AND GRAVEL, compact, fine to medium grained sand, fine grained gravel, well graded, brown, wet	666.87		8MC		100		0.0
40	END OF BOREHOLE @ 37.5ft BGS	664.87						
	SM-SILTY SAND, compact, fine grained, poorly graded, brown, wet			39-44' -081				
42	SW-SAND, trace to with silt, compact, fine to medium grained, well graded, brown, wet	662.37		9MC		100		0.0
44	SM-SAND, with silt, compact, fine grained, poorly graded, brown, wet	660.87						
46				44-49' -079				
48	- 6" medium grained sand at 48.0ft BGS			10MC		60		0.0
50		654.37						
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

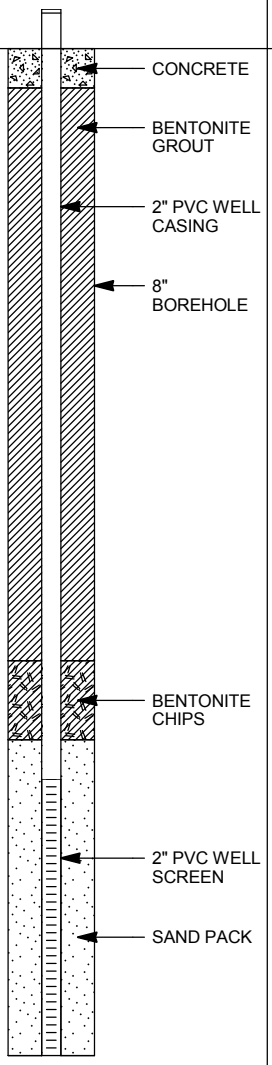
HOLE DESIGNATION: MW-104S
DATE COMPLETED: January 25, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351657.92
EASTING: 12771512.37

TOP OF CASING 706.55
GROUND SURFACE 703.86

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	OL-ORGANIC SANDY SILT, trace peat, loose, black, moist	703.16
2	SM-SILTY SAND, trace fine grained subrounded gravel, compact, fine grained, poorly graded, light brown, moist	700.36
4	OL-ORGANIC SILT, trace sand, trace clay, compact, slight plasticity, dark brown, trace olive lenses, moist	699.36
6	SP-SAND, trace silt, compact, medium grained sand, poorly graded, olive brown, wet - medium grained at 7.0ft BGS	696.36
8	SP/GP-SAND AND GRAVEL, compact, medium to coarse grained sand, fine grained gravel, poorly graded, yellowish brown, wet	694.36
10	SP-SAND, trace fine grained subrounded gravel, compact, medium grained, poorly graded, light brown, wet	
12	- gravelly sand at 13.0ft BGS	
14	- fine grained sand at 14.5ft BGS	
16	- 1/4" lens silty clay at 17.0ft BGS - gravelly coarse grained sand at 17.0ft BGS	
18	- medium grained sand at 17.8ft BGS - 3" lens, coarse gravel, with sand at 18.4ft BGS	
20	- fine grained sand at 18.7ft BGS	
22		
24	- 4" lens coarse grained gravel at 24.6ft BGS	
26	- coarse grained sand, with fine grained gravel at 25.5ft BGS END OF BOREHOLE @ 25.5ft BGS	678.36
28		
30		
32		
34		

MONITORING WELL



WELL DETAILS
Screened interval:
685.36 to 678.36ft
18.50 to 25.50ft BGS
Length: 7ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
688.36 to 686.36ft
15.50 to 17.50ft BGS
Material: BENTONITE CHIPS
Sand Pack:
686.36 to 678.36ft
17.50 to 25.50ft BGS

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 4/25/11

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-104S
DATE COMPLETED: January 25, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	
36			Material: #4 SAND					
38								
40								
42								
44								
46								
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-104D
DATE COMPLETED: January 25, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351658.87
EASTING: 12771508.51

TOP OF CASING 706.42
GROUND SURFACE 703.48

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
0	OL-ORGANIC SANDY SILT, trace peat, loose, black, moist	702.78	CONCRETE					
2	SM-SILTY SAND, trace fine grained subrounded gravel, compact, fine grained, poorly graded, light brown, moist		BENTONITE GROUT	1MC		60		0.0
		699.98						
4	OL-ORGANIC SILT, trace sand, trace clay, compact, slight plasticity, dark brown, trace olive lenses, moist	698.98	2" PVC WELL CASING					
6	SP-SAND, trace silt, compact, medium grained sand, poorly graded, olive brown, wet - medium grained at 7.0ft BGS		8" BOREHOLE					
8	SP/GP-SAND AND GRAVEL, compact, medium to coarse grained sand, fine grained gravel, poorly graded, yellowish brown, wet	695.98		2MC 5-10' -053		80		0.0
		693.98						
10	SP-SAND, trace fine grained subrounded gravel, compact, medium grained, poorly graded, light brown, wet							
12	- gravelly sand at 13.0ft BGS			3MC 10-15' -051		80		0.0
14	- fine grained sand at 14.5ft BGS							
16	- 1/4" lens silty clay at 17.0ft BGS - gravelly coarse grained sand at 17.0ft BGS			4MC 15-20' -049		100		0.0
18	- medium grained sand at 17.8ft BGS - 3" lens, coarse gravel, with sand at 18.4ft BGS							
20	- fine grained sand at 18.7ft BGS							
22				5MC 20-25' -047		60		0.0
24	- 4" lens coarse grained gravel at 24.6ft BGS							
26	- coarse grained sand, with fine grained gravel at 25.5ft BGS - fine grained sand at 26.0ft BGS							
28				6MC 25-30' -046		100		0.0
30								
32	- gravelly sand, fine grained gravel, coarse grained sand, occasional highly oxidized lenses up to 1/4" thick at 31.5ft BGS - 1/8" lens dark brown sandy silt at 32.8ft BGS			7MC 30-35' -042		80		0.0
34	- fine grained sand at 32.9ft BGS - medium grained sand at 34.6ft BGS							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( )

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-104D
DATE COMPLETED: January 25, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36	- fine grained sand at 36.0ft BGS		BENTONITE CHIPS	8MC 35-40' -040		70		0.0
38								
40	- 6" lens laminated sand and silty sand at 39.5ft BGS		2" PVC WELL SCREEN					
42				9MC 40-45' -036		70		0.0
44	- slight increase in grain size at 43.0ft BGS		SAND PACK					
46	END OF BOREHOLE @ 45.0ft BGS	658.48						
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								

WELL DETAILS
Screened interval:
663.98 to 658.98ft
39.50 to 44.50ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
666.98 to 664.98ft
36.50 to 38.50ft BGS
Material: BENTONITE CHIPS
Sand Pack:
664.98 to 658.48ft
38.50 to 45.00ft BGS
Material: #4 SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

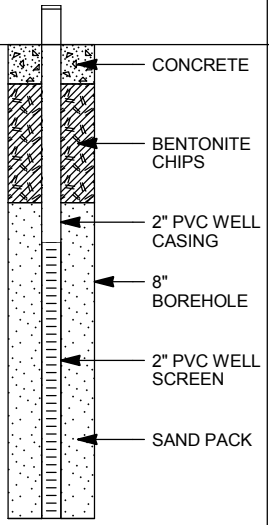
HOLE DESIGNATION: MW-105S
DATE COMPLETED: January 26, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351648.25
EASTING: 12771740.97

TOP OF CASING 707.86
GROUND SURFACE 704.89

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	PT-PEAT, trace silt, loose, brown, moist	704.09
2	SM-SILTY SAND, trace fine grained gravel, compact, fine grained, poorly graded, brown, moist	
4		700.19
6	OL-ORGANIC SILT, trace peat, loose, brown, very moist	697.89
8	SM-SILTY SAND, trace fine grained subrounded gravel, loose, fine grained, poorly graded, olive gray and brown, highly oxidized, wet	696.89
10	- 1.5" lens fine grained sand at 7.4ft BGS - 3" highly oxidized at 7.6ft BGS	
12	SP-GRAVELLY SAND, compact, coarse grained sand, fine grained subrounded gravel, poorly graded, yellowish brown, wet	692.89
14	- sand, trace gravel, medium grained at 11.0ft BGS END OF BOREHOLE @ 12.0ft BGS	
16		
18		
20		
22		
24		
26		
28		
30		
32		
34		

MONITORING WELL



WELL DETAILS
Screened interval:
699.89 to 692.89ft
5.00 to 12.00ft BGS
Length: 7ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
703.89 to 700.89ft
1.00 to 4.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
700.89 to 692.89ft
4.00 to 12.00ft BGS
Material: #4 SAND

SAMPLE				
NUMBER	INTERVAL	REC (%)	'N' VALUE	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-105D
DATE COMPLETED: January 26, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351649.34
EASTING: 12771736.18

TOP OF CASING 707.89
GROUND SURFACE 704.79

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	PT-PEAT, trace silt, loose, brown, moist	703.99
2	SM-SILTY SAND, trace fine grained gravel, compact, fine grained, poorly graded, brown, moist	
4		700.09
6	OL-ORGANIC SILT, trace peat, loose, brown, very moist	697.79
8	SM-SILTY SAND, trace fine grained subrounded gravel, loose, fine grained, poorly graded, olive gray and brown, highly oxidized, wet	696.79
10	- 1.5" lens fine grained sand at 7.4ft BGS - 3" highly oxidized at 7.6ft BGS	
12	SP-GRAVELLY SAND, compact, coarse grained sand, fine grained subrounded gravel, poorly graded, yellowish brown, wet - sand, trace gravel, medium grained at 11.0ft BGS	
14		
16		
18	- 3" lens highly oxidized at 17.0ft BGS - fine grained sand, occasional clay lenses up to 1/8" thick at 17.5ft BGS	
20	- clay lenses not present at 19.0ft BGS - 3" lens clayey sand at 20.5ft BGS	684.09
22	GP-SANDY GRAVEL, loose, coarse grained sand, fine grained subrounded gravel, poorly graded, yellowish brown, wet, several oxidized lenses	681.79
24	- 2" lens medium grained sand at 22.5ft BGS - 2" lens fine grained sand at 22.7ft BGS	680.29
26	SM-SILTY SAND, trace fine grained subrounded gravel, compact, fine grained, poorly graded, light brown, wet - 1" lens silty clay at 24.8ft BGS	679.29 677.79
28	GP-SANDY GRAVEL, compact, fine and coarse grained gravel, coarse grained sand, poorly graded ,yellowish brown, wet	
30	SP-SAND, trace gravel, compact, fine grained, poorly graded, yellowish brown, wet	
32	SP/GP-GRAVEL AND SAND, compact, coarse grained sand, fine grained subrounded gravel, poorly graded, brown, wet - 1/4" lens highly oxidized at 28.5ft BGS	672.29
34	SP-SAND, compact, fine grained, poorly graded, light brown, wet - coarse grained, trace fine grained gravel at	

MONITORING WELL: CONCRETE; BENTONITE GROUT; 2" PVC WELL CASING; 8" BOREHOLE

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1MC		70		0.0
2MC		80		0.0
7-12' -054				
3MC		80		0.0
12-17' -052				
4MC		90		0.0
17-22' -050				
5MC		100		0.0
22-27' -048				
6MC		80		0.0
27-32' -044				
7MC		80		0.0
32-37' -041				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 4/25/11

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-105D
DATE COMPLETED: January 26, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36	33.2ft BGS - fine grained sand at 34.0ft BGS - 2" lens sand with fine grained gravel at 36.5ft BGS			8MC		80		0.0
38								
40			BENTONITE CHIPS	37-42' -039				
42				9MC		80		0.0
44	- slight increase in grain size at 44.0ft BGS		2" PVC WELL SCREEN	42-47' -034				
46			SAND PACK					
48				10MC				0.0
50	END OF BOREHOLE @ 50.0ft BGS	654.79						
52								
54								
56								
58								
60								
62								
64								
66								
68								

WELL DETAILS
Screened interval:
662.79 to 657.79ft
42.00 to 47.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
665.79 to 663.79ft
39.00 to 41.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
663.79 to 657.79ft
41.00 to 47.00ft BGS
Material: #4 SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-106S
DATE COMPLETED: January 28, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	NORTHING: 351569.83 EASTING: 12771929.54 TOP OF CASING GROUND SURFACE	706.96 703.89					
0	ML-SILT, with sand, trace gravel, rootlets, compact, no plasticity, dark brown, moist		CONCRETE; BENTONITE CHIPS				
2	- 6" light brown at 1.3ft BGS						
4	- 4" light brown, very moist at 3.5ft BGS - gray, wet at 4.1ft BGS - sandy silt, trace fine grained gravel at 4.5ft BGS		2" PVC WELL CASING; 8" BOREHOLE				
6	- loose at 5.5ft BGS		2" PVC WELL SCREEN				
8	- olive gray at 7.0ft BGS		SAND PACK				
10	END OF BOREHOLE @ 9.0ft BGS	694.89					
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							
34							

WELL DETAILS
Screened interval:
701.89 to 694.89ft
2.00 to 9.00ft BGS
Length: 7ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
703.39 to 702.89ft
0.50 to 1.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
702.89 to 694.89ft
1.00 to 9.00ft BGS
Material: #4 SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-106D
DATE COMPLETED: January 28, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351572.37
EASTING: 12771932.52

TOP OF CASING 706.36
GROUND SURFACE 703.66

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
0	ML-SILT, with sand, trace gravel, rootlets, compact, no plasticity, dark brown, moist		CONCRETE					
2	- 6" light brown at 1.3ft BGS		BENTONITE GROUT	1MC		80		0.0
4	- 4" light brown, very moist at 3.5ft BGS - gray, wet at 4.1ft BGS - sandy silt, trace fine grained gravel at 4.5ft BGS		2" PVC WELL CASING					
6	- loose at 5.5ft BGS		8" BOREHOLE	4-9' -033				
	- olive gray at 7.0ft BGS			2MC		40		0.0
8								
10								
		692.66		9-14' -030				
12	GP-GRAVEL, with sand, compact, fine grained subrounded gravel, medium grained sand, poorly graded, brown, wet	691.16		3MC		80		0.0
14	SP-SAND, trace to with silt, compact, fine grained, poorly graded, brown, wet							
		688.16		14-19' -028				
16	GP-SANDY GRAVEL, compact, coarse grained sand, fine grained subrounded gravel, brown, wet			4MC		60		0.0
18								
20		683.16						
	SP-SAND, with gravel, compact, medium to coarse grained sand, fine grained gravel, poorly graded, yellowish brown, wet			19-24' -024				
22				5MC		80		0.0
24								
26	- fine grained sand at 26.0ft BGS			24-29' -021				
				6MC		80		0.0
28	GP-GRAVEL, with sand, compact, fine grained subrounded gravel, poorly graded, gray, wet	675.66						
30								
		672.16		29-34' -019				
32	SP-SAND, loose, coarse grained, poorly graded, brown, wet			7MC		70		0.0
34	GP-GRAVEL, with sand, loose, fine grained	669.66						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( )

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 4/25/11

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-106D
DATE COMPLETED: January 28, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36	subrounded gravel, poorly graded, brown, wet	668.16	BENTONITE CHIPS	34-39' -016				
	SP-SAND, trace silt, compact, medium grained, poorly graded, brown, wet			8MC		80		0.0
38	- fine grained, light brown at 36.0ft BGS							
40			2" PVC WELL SCREEN					
42				39-44' -014				
			SAND PACK	9MC		100		0.0
44								
	END OF BOREHOLE @ 45.0ft BGS	658.66						
46			WELL DETAILS Screened interval: 664.66 to 659.66ft 39.00 to 44.00ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: 667.66 to 665.66ft 36.00 to 38.00ft BGS Material: BENTONITE CHIPS Sand Pack: 665.66 to 658.66ft 38.00 to 45.00ft BGS Material: #4 SAND					
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( )

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 4/25/11

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

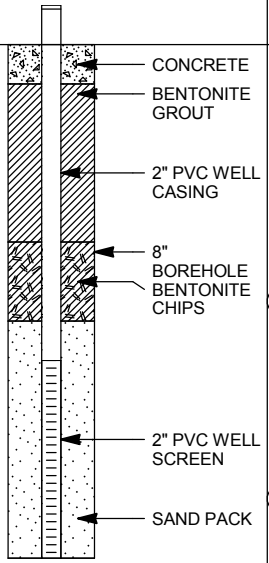
HOLE DESIGNATION: MW-107S
DATE COMPLETED: January 24, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351407.74
EASTING: 12771921.37

TOP OF CASING 706.73
GROUND SURFACE 703.76

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	ML-SILT TOPSOIL), trace sand, trace gravel, loose, dark brown, moist	703.56
2	SM-SILTY SAND (FILL), trace gravel, compact, fine grained, poorly graded, brown, moist	702.56
4	SP-SAND, trace silt, compact, medium grained, poorly graded, light brown, moist - medium to coarse grained, reddish brown at 3.1ft BGS	
6	- yellowish brown, wet at 4.0ft BGS - brownish gray at 4.6ft BGS	
8	- trace coarse grained subrounded gravel at 6.0ft BGS	696.26
10	GP-SANDY GRAVEL, loose, medium grained sand, fine grained gravel, gray, wet - brown at 8.0ft BGS - fine to coarse grained gravel at 10.0ft BGS	
12		
14		
16	- gravel with sand at 15.0ft BGS	
18		
20	- 6" highly oxidized at 18.5ft BGS - sandy gravel at 19.5ft BGS	
22		
24		
26	- 6" silty clay, trace fine grained gravel, brown at 24.5ft BGS	
28		
30	- no recovery from 30 to 35' bgs at 30.0ft BGS	
32		
34		

MONITORING WELL



WELL DETAILS
Screened interval:
695.76 to 690.76ft
8.00 to 13.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
698.76 to 696.76ft
5.00 to 7.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
696.76 to 690.76ft
7.00 to 13.00ft BGS
Material: #4 SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1MC		60		0.0
4-9' -032				
2MC		80		0.0
9-14' -029				
3MC		40		0.0
14-19' -025				
4MC		40		0.0
19-24' -022				
5MC		50		0.0
24-29' -020				
6MC		20		0.0
29-34' -018				
7MC		0		0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval)

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 4/25/11

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-107S
DATE COMPLETED: January 24, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36	SP-SAND, trace silt, compact, fine grained, poorly graded, brown, wet, occasional oxidized lenses	668.26		34-39' -015 8MC		100		0.0
38								
40								
42				39-44' -013 9MC		0		0.0
44								
46	END OF BOREHOLE @ 45.0ft BGS	658.76						
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( )

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

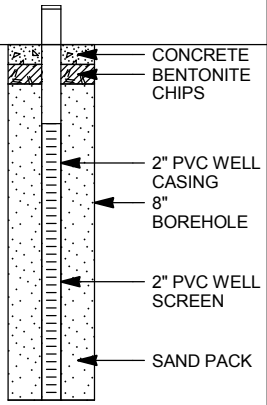
HOLE DESIGNATION: MW-108S
DATE COMPLETED: January 28, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351314.94
EASTING: 12771922.19

TOP OF CASING 706.21
GROUND SURFACE 703.32

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	SM/ML-SANDY SILT (FILL), loose, no plasticity, dark brown, moist	
	- 3" wood debris (root) at 1.0ft BGS	
	- 6" lens silty sand at 2.3ft BGS	
4	SP-SAND, with gravel, trace silt, compact, coarse grained sand, fine grained subrounded gravel, poorly graded, gray, wet	699.32
6	ML-SILT, with sand, loose, no plasticity, brown, wet	697.32
8	GM-SILTY GRAVEL, trace sand, loose, coarse grained gravel, poorly graded, brown, wet	695.82
	SP/GP-SAND AND GRAVEL, trace silt, compact, coarse grained sand, fine grained gravel, trace coarse grained gravel, poorly graded, brown, wet	695.12
10	END OF BOREHOLE @ 9.0ft BGS	694.32
12		
14		
16		
18		
20		
22		
24		
26		
28		
30		
32		
34		

MONITORING WELL



WELL DETAILS
Screened interval:
701.32 to 694.32ft
2.00 to 9.00ft BGS
Length: 7ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
702.82 to 702.32ft
0.50 to 1.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
702.32 to 694.32ft
1.00 to 9.00ft BGS
Material: #4 SAND

SAMPLE				
NUMBER	INTERVAL	REC (%)	'N' VALUE	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-108D
DATE COMPLETED: January 28, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351320.9
EASTING: 12771921.79

TOP OF CASING 706.16
GROUND SURFACE 703.39

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	SM/ML-SANDY SILT (FILL), loose, no plasticity, dark brown, moist	
2	- 3" wood debris (root) at 1.0ft BGS - 6" lens silty sand at 2.3ft BGS	
4		699.39
	SP-SAND, with gravel, trace silt, compact, coarse grained sand, fine grained subrounded gravel, poorly graded, gray, wet	
6		697.39
	ML-SILT, with sand, loose, no plasticity, brown, wet	
		695.89
8	GM-SILTY GRAVEL, trace sand, loose, coarse grained gravel, poorly graded, brown, wet	695.19
10	SP/GP-SAND AND GRAVEL, trace silt, compact, coarse grained sand, fine grained gravel, trace coarse grained gravel, poorly graded, brown, wet	
12		
14		
16		
18	- 3" lens silty sand and gravel at 17.5ft BGS - fine to coarse grained gravel, medium grained sand at 18.0ft BGS	
20		
22		
24		
26		
28		
30		
32		
34		

MONITORING WELL: CONCRETE; BENTONITE GROUT; 2" PVC WELL CASING; 8" BOREHOLE

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1MC	0-4'	60		0.0
4-9' -076				
2MC	4-9'	60		0.0
9-14' -075				
3MC	9-14'	20		0.0
14-19' -068				
4MC	14-19'	80		0.0
19-24' -066				
5MC	19-24'	20		0.0
24-29' -064				
6MC	24-29'	40		0.0
29-34' -062				
7MC	29-34'	60		0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( )

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 4/25/11

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-108D
DATE COMPLETED: January 28, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36			BENTONITE CHIPS	34-39' -060				
38				8MC		80		0.0
40	SP-SAND, trace silt, compact, fine grained, poorly graded, light brown, wet	664.39						
42			2" PVC WELL SCREEN	39-44' -056				
44			SAND PACK	9MC		60		0.0
46	END OF BOREHOLE @ 45.0ft BGS	658.39						
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								

WELL DETAILS
Screened interval:
663.39 to 658.39ft
40.00 to 45.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
667.39 to 664.39ft
36.00 to 39.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
664.39 to 658.39ft
39.00 to 45.00ft BGS
Material: #4 SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( )

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

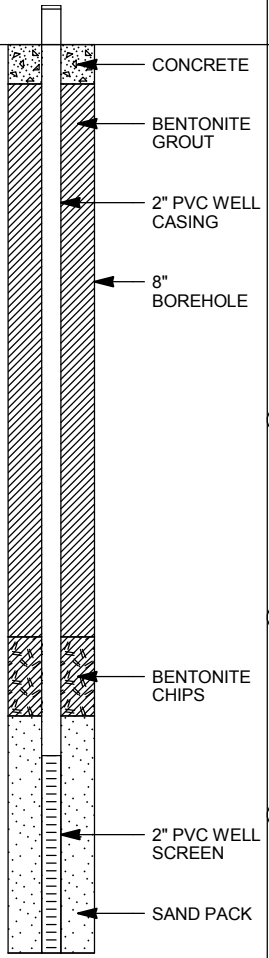
HOLE DESIGNATION: MW-109D
DATE COMPLETED: January 31, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

NORTHING: 351199.24
EASTING: 12771714.08

TOP OF CASING 710.46
GROUND SURFACE 707.41

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	SM-SILTY SAND (TOPSOIL, FILL), loose, brown, moist	
		706.01
2	SM-SILTY SAND (FILL), trace gravel, compact, fine grained, poorly graded, light brown, moist	
		704.41
	- 3" lens coarse grained gravel at 2.2ft BGS	703.91
4	SM-SILTY SAND (natural), compact, fine grained, poorly graded, rusty brown, moist	
6	SP-SAND, with silt, compact, fine grained, poorly graded, light yellowish brown, moist	
	- occasional oxidized lenses 1/8" thick at 4.5ft BGS	
8	- wet at 7.0ft BGS	
10	GP-SANDY GRAVEL, loose, fine and coarse grained subrounded gravel, poorly graded, brown, wet	697.41
12		
14		
16	SP/GP-SAND AND GRAVEL, compact, fine and coarse grained sand, fine grained gravel, poorly graded, yellowish brown, wet	691.41
18		
20		
22		
24	- medium brown at 24.0ft BGS	
26		
28		
		678.41
30	SP-SAND, trace silt, compact, fine grained, poorly graded, brown, wet	
	- medium grained at 31.0ft BGS	
32	- coarse grained, trace fine grained subrounded gravel at 32.0ft BGS	674.91
34	SP/GP-SAND AND GRAVEL, trace silt, compact, coarse grained sand, fine grained subrounded gravel, poorly graded, yellowish	

MONITORING WELL



WELL DETAILS
Screened interval:
689.41 to 684.41ft
18.00 to 23.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
692.41 to 690.41ft
15.00 to 17.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
690.41 to 684.41ft
17.00 to 23.00ft BGS
Material: #4 SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1MC		80		0.0
2MC		20		0.0
7-12' -077				
3MC		10		0.0
12-17' -074				
4MC		60		0.0
17-22' -070				
5MC		40		0.0
22-27' -067				
6MC		80		0.0
27-32' -065				
7MC		60		0.0
32-37' -063				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-109D
DATE COMPLETED: January 31, 2011
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36	brown, wet							
	SP-SAND, with silt, compact, fine grained, poorly graded, light brown, wet	671.41		8MC		100		0.0
38								
				37-42' -061				
40								
42				9MC		80		0.0
44								
				42-47' -057				
	END OF BOREHOLE @ 45.0ft BGS	662.41						
46								
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( )

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 4/25/11

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-110
DATE COMPLETED: November 18, 2010
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SM-SANDY SILT (TOPSOIL, FILL), trace gravel, compact, brown, moist, roots present						
2	SM-SILTY SAND (natural), trace fine grained gravel, compact, fine grained, poorly graded, rusty brown, moist	1.50	1MC		60		0.0
4	SP/GP-SAND AND GRAVEL, compact, medium grained sand, fine grained subrounded gravel, brown, moist - light brown at 4.0ft BGS	3.00					
6	- cobble at 7.0ft BGS		2MC		80		0.0
8	- cobble at 8.0ft BGS	8.40					
10	SP-SAND, trace gravel, compact, coarse grained sand, poorly graded, light brown, moist						
12	- gravelly sand at 13.0ft BGS		3MC		80		0.0
14	- sand, with gravel, yellowish brown, moist to very moist at 14.0ft BGS						
16							
18	SM/GM-SAND AND GRAVEL, trace to with silt, loose, medium grained sand, fine grained subrounded gravel, yellowish brown, wet	17.00	4MC		60		0.0
20			17-22' -096				
22	- dark brown at 22.0ft BGS		5MC		60		0.0
24	- trace coarse grained subrounded gravel at 23.0ft BGS		22-27' -092				
26							
28			6MC		0		0.0
30			27-32' -090				
32	GP-SANDY GRAVEL, with silt, compact, fine grained subrounded gravel, medium grained sand, poorly graded, yellowish brown, highly oxidized, wet	30.50	7MC		80		0.0
34	SP-GRAVELLY SAND, trace silt, compact, medium grained sand, poorly	34.00	32-37' -088				

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( )

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: MW-110
DATE COMPLETED: November 18, 2010
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER / E. VARNAS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36	graded, grayish brown, wet						
38	SP/GP-SAND AND GRAVEL, trace silt, compact, medium grained sand, fine grained subrounded gravel, trace coarse grained gravel, poorly graded, grayish brown, wet	37.50	8MC		80		0.0
			(37-42' -082)				
40							
42			9MC		80		0.0
44			(42-47' -080)				
46							
48	SP-SAND, trace to with silt, compact, fine grained, poorly graded, brown, wet	47.00	10MC		80		0.0
50			(47-52' -078)				
52			11MC		100		0.0
54			(52-57' -076)				
56	END OF BOREHOLE @ 55.0ft BGS NOTE: TEMPORARY WELL INSTALLED DURING VERTICAL AQUIFER SAMPLING	55.00					
58							
60							
62							
64							
66							
68							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( )

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: GP-1
DATE COMPLETED: November 23, 2010
DRILLING METHOD: 4-1/4" HSA
FIELD PERSONNEL: D. DEITNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	GAS PROBE	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	NORTHING: 351278.28 EASTING: 12771784.69 TOP OF CASING GROUND SURFACE	709.88 707.35					
0	SM/ML-SANDY SILT (FILL), trace fine grained gravel, compact, fine grained sand, no plasticity, brown, moist		CONCRETE; 1/2" PVC WELL CASING; BENTONITE CHIPS; 8-1/4" BOREHOLE; 1/2" PVC WELL SCREEN; SAND PACK				
4	END OF BOREHOLE @ 4.0ft BGS	703.35					

WELL DETAILS
Screened interval:
705.35 to 703.35ft
2.00 to 4.00ft BGS
Length: 2ft
Diameter: 0.5in
Slot Size: 0.010
Material: PVC
Seal:
706.35 to 705.85ft
1.00 to 1.50ft BGS
Material: BENTONITE CHIPS
Sand Pack:
705.85 to 703.35ft
1.50 to 4.00ft BGS
Material: #3 SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

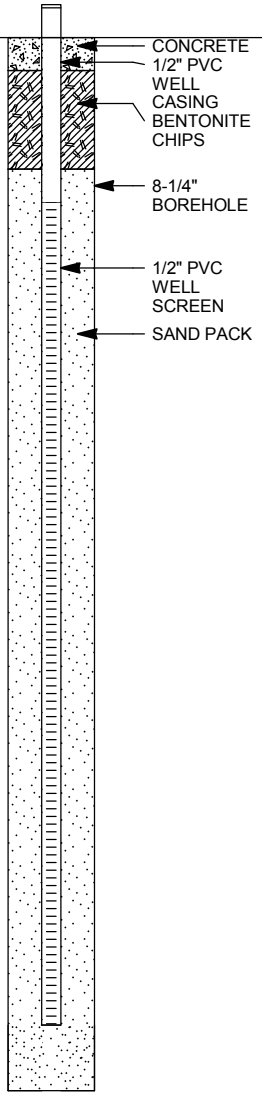
HOLE DESIGNATION: GP-2
DATE COMPLETED: November 23, 2010
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER

NORTHING: 351034
EASTING: 12771486.64

TOP OF CASING 736.12
GROUND SURFACE 732.88

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
0	SM/ML-SANDY SILT (FILL), trace fine grained gravel, compact, fine grained sand, no plasticity, brown, moist	
6	SP-SAND (natural), trace silt, compact, fine grained, poorly graded, light yellowish brown, laminated, occasional thin oxidized lenses 1/8" thick	726.38
18	GP-SANDY GRAVEL, compact, fine grained sand, fine grained subrounded gravel, poorly graded, grayish brown, moist - fine grained gravel, trace coarse grained sand at 19.0ft BGS - fine grained gravel, with coarse grained sand, trace coarse grained gravel at 20.0ft BGS - occasional cobbles at 26.0ft BGS	714.38
28	SP-SAND, trace fine grained gravel, compact, medium to coarse grained sand, poorly graded, light yellowish brown, moist	704.88
35	END OF BOREHOLE @ 35.0ft BGS	697.88

GAS PROBE



WELL DETAILS
Screened interval:
727.88 to 702.88ft
5.00 to 30.00ft BGS
Length: 25ft
Diameter: 0.5in
Slot Size: 0.010
Material: PVC
Seal:
731.88 to 728.88ft
1.00 to 4.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1MC		24		0.0
2MC		16		0.0
3MC		40		0.0
4MC		70		0.0
5MC		70		0.0
6MC		70		0.0
7MC		0		0.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: GP-2
DATE COMPLETED: November 23, 2010
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: D. DEITNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	GAS PROBE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
44			728.88 to 700.88ft 4.00 to 32.00ft BGS Material: #3 SAND					
46								
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								
70								
72								
74								
76								
78								
80								
82								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: GP-3
DATE COMPLETED: November 23, 2010
DRILLING METHOD: 4-1/4" HSA
FIELD PERSONNEL: D. DEITNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	GAS PROBE	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	NORTHING: 351290.17 TOP OF CASING EASTING: 12771276.59 GROUND SURFACE	706.47 703.51					
0	SM/ML-SANDY SILT (FILL), trace fine grained gravel, compact, fine grained sand, no plasticity, brown, moist		CONCRETE 1/2" PVC WELL CASING BENTONITE CHIPS 8-1/4" BOREHOLE 1/2" PVC WELL SCREEN SAND PACK				
5	END OF BOREHOLE @ 5.0ft BGS	698.51					

WELL DETAILS
Screened interval:
701.01 to 699.01ft
2.50 to 4.50ft BGS
Length: 2ft
Diameter: 0.5in
Slot Size: 0.010
Material: PVC
Seal:
702.51 to 701.51ft
1.00 to 2.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
701.51 to 698.51ft
2.00 to 5.00ft BGS
Material: #3 SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

APPENDIX C

HEALTH AND SAFETY PLAN